REMARKS

Favorable reconsideration and allowance of the present application are respectfully requested in view of the following remarks.

Claims 22-44 are pending in this case, including independent claims 22 and 44. Independent claim 22, for instance, is directed to a method for rapidly heating and cooling semiconductor wafers in a thermal processing chamber. In the method of claim 22, a semiconductor wafer is placed in a substrate holder contained in a thermal processing chamber, and the semiconductor wafer is rapidly heated to a predetermined temperature using a heat source. The semiconductor wafer is then cooled using an active cooling device. The cooling device of claim 22 comprises a cooling member maintained at a temperature lower than the wafer, and the cooling member defines one or more cooling channels for circulating a cooling fluid therethrough and defines one or more gas passages for flowing a cooling gas therethrough. The one or more gas passages are configured to direct the cooling gas towards the semiconductor wafer and the substrate holder so that the cooling gas contacts the semiconductor wafer and cools the wafer.

In the Office Action, independent claims 22 and 44 were rejected under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent No. 5,226,732 to Nakos, et al. Nakos, et al. is directed to a contactless temperature measurement system which includes a workpiece, a chamber containing the workpiece with the walls thereof being substantially transmissive to radiation at wavelengths other than a given wavelength and substantially reflective at the given wavelength to remove the dependence of the apparent or measured temperature on the workpiece emissivity variations or fluctuations. Nakos, et al. accomplishes its goal of removing the dependence of apparent or measured temperature on the workpiece's emissivity or variations in emissivity by including in its system an optical pyrometer disposed to detect radiation from the workpiece at substantially only the given wavelength. Nakos, et al. further accomplishes this with its highly reflective multi-layer film 12 that is disposed on the inner surface of the processing chamber 10.

With regard to "cooling," Nakos, et al. discloses a cooling gas distribution system 32, which has an upper segment 34 and a lower segment 36, made preferably of stainless steel. The entire processing chamber 10 and the tungsten-halogen lamps 30 are housed *in* the cooling gas distribution system. (Col. 3, line 53 – col. 4, line 10).

Applicant respectfully submits that independent claims 22 and 44 are not anticipated by Nakos, et al. at least for the reason that Nakos, et al. does not teach a method that includes a cooling step, whereby a semiconductor wafer is cooled using an active cooling device that comprises a cooling member that defines one or more gas passages, wherein such gas passages are configured to direct a cooling gas towards the semiconductor wafer and substrate holder so that the cooling gas *contacts* the semiconductor wafer and cools the wafer. (See, e.g., Applicant's Figure 4). In Nakos, et al., Figure 1 clearly shows that both the upper segment 34 and the lower segment 36 of the cooling gas distribution system 32 are completely separated from the interior of the processing chamber 10 which contains the semiconductor wafer 26 and into which processing gases are injected through port 14. For example, with regard to the upper segment 34 of the cooling gas distribution system 32, even when air or N_2 is allowed to flow into the area where tungsten-halogen lamps 30 are housed, no "cooling gas" *contacts* the semiconductor wafer 26 because of the quartz walls of processing chamber 10 and the specially-designed multi-layer film 12 on the inner surface of such quartz walls, which separate the interior of processing chamber 10 from, for example, the tungsten-halogen lamps 30.

Likewise, with regard to the lower segment 36 of the cooling gas distribution system 32, air or N_2 is only allowed to circulate within one or more confined spaces (like the space in the lower right-hand corner of Figure 1) and does not contact Nakos, et al.'s semiconductor wafer 26. Rather, any cooling gas used in this lower segment 36 of the cooling gas distribution system 32 of Nakos, et al. is separated from the wafer 26 by, at least, the quartz walls of the processing chamber 10, the multi-layer film 12 that lines the inner surface of the processing chamber, and the segment 28 of the processing chamber 10 which is transparent to radiation over at least the wavelength range for which optical pyrometer 48 is sensitive.

Thus, Applicant respectfully submits that Nakos, et al. does not teach a method for rapidly heating and cooling semiconductor wafers in a thermal processing chamber according to Applicant's independent claims 22 and 44, wherein, among other steps in the method, a semiconductor wafer is cooled using an active cooling device that comprises a cooling member, wherein the cooling member defines one or more gas passages for flowing a cooling gas therethrough, and wherein the one or more gas passages are configured to direct the cooling gas towards the semiconductor wafer and the substrate holder so that the cooling gas *contacts the semiconductor wafer and cools the wafer*. Therefore, Applicants respectfully submit that independent claims 22 and 44 patentably define over Nakos, et al.

Dependent claims 23-43 were also rejected under 35 U.S.C. § 102(b) as being anticipated by Nakos, et al. Applicant respectfully submits, however, that at least for the reasons indicated above relating to corresponding independent claims 22 and 44; dependent claims 23-43 patentably define over the reference cited. However, Applicant also notes that the patentability of dependent claims 23-43 does not necessarily hinge on the patentability of independent claims 22 and 44. In particular, some or all of dependent claims 23-43 may possess features that are independently patentable, regardless of the patentability of claims 22 and 44.

In summary, Applicant respectfully submits that the present claims patentably define over the prior art of record for at least the reasons set forth above. As such, it is believed that the present application is in complete condition for allowance and favorable action, therefore, is respectfully requested. Examiner Toledo is invited and encouraged to telephone the undersigned, however, should any issues remain after consideration of this Response.

Please charge any additional fees required by this Response to Deposit Account No. 04-1403.

Respectfully submitted,

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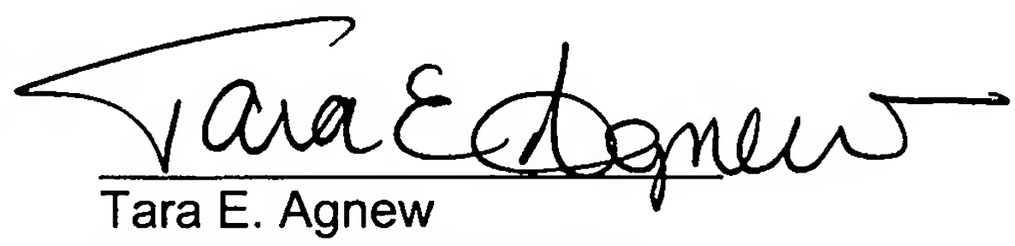

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